WHAT IS CLAIMED IS:

1.   A method for combining communication beams in a wireless communication system, the method comprising the steps of:

    receiving a data communication signal on a plurality of antennas forming an antenna array, each of said plurality of antennas producing a received signal as an output;

    creating N beams from the output received signals, where N is an integer ≥ 2;

    selecting one of said N beams as the primary received signal;

    selecting at least one of said N beams as an auxiliary received signal;

    processing said primary received signal and said auxiliary received signal to detect an output message signal; and

    demodulating said output message signal to detect a binary stream that carries a received message.

2.   The method of claim 1 wherein said step of selecting the primary signal includes the step of identifying the beam of said N beams in which a desired signal is strongest.

3.   The method of claim 2 wherein said step of processing said primary received signal and said auxiliary received signal comprises the sub-steps of:

    assigning weights to each of said primary received signal and said auxiliary received signal; and

    combining said primary received signal and said auxiliary received signal in accordance with their respectively assigned weights.

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1 4. A system for combining communication beams in a wireless

2 communication system, the system comprising:

3   an antenna array that includes N antenna elements where N is an integer $\geq$

4 2;

5   an analog beamformer that is coupled to said antenna or antenna elements

6 array and generates N orthogonal beams;

7   a switch network that is coupled to the analog beamformer and receives

8 the N independent beams and provides M output beams where M is an integer

9 and $1 \leq M < N$;

10   a primary receiver that is coupled to said switch network and that receives

11 one of said M beams;

12   M-1 auxiliary receivers that are coupled to said switch network and that

13 receive a subset of said M beams; and

14   a signal processor that is coupled to said primary receiver and said M-1

15 auxiliary receivers and that produces an output signal from outputs of the

16 primary receiver and the M-1 auxiliary receivers.

1 5. The system of claim 4 wherein said switch network comprises an

2 exclusion logic N-to-M switch network.

1 6. The system of claim 4 wherein said switch network is coupled to said

2 signal processor.

1 7. The system of claim 6 wherein said switch network includes N switch

2 elements wherein each switch element includes:

3   M output ports;

4   a terminating load;

5   a single pole M+1 throw switch coupled to said terminating load and said

6   M output ports; and

7   a switch driver coupled to said single pole M+1 throw switch.

1   8.   The system of claim 7 wherein said coupling of said switch network to

2   said signal processor occurs via the switch driver of each of the N switch

3   elements.